A Spectrum of IV&V Modeling Techniques

Definition of Validation Methods for Modeling Languages[1]

Our work brings together 1) externally validated modeling languages and their associated verification tools, and 2) unproven new verification strategies running on new (although similar to established) modeling languages. We will assume the validity of 1) and use it to (hopefully) confirm the validity of 2). Our initial focus is to make sure that models written in different modeling languages are equivalent. Once this has been established, we will be able to confirm that the same properties (or injected errors violating properties) are found in models written in diverse languages and tested by diverse methods. Results are not likely to match exactly, and we hope also to learn where the strengths and weakness of each method lie.

1. University of Minnesota (UMN) Modeling Languages and Test Engines

Detailed information concerning UMN's RSML^{-e} language, related tools, and past case studies can be found in the "Case Study" report associated with this project, or the following documents: "Collect Models from UMN Clients" (umn_models.pdf), "Definition of UMN Languages: RSML^{-e}" (umn_languages.pdf), and "Definition of UMN Test Engines" (umn_test_engines.pdf).

2. West Virginia University (WVU), NASA IV&V Modeling Languages and Test Engines

Detailed descriptions of WVU / NASA languages and models can also be found in the "Case Study" report, or: "Definition of WVU Languages" (wvu_languages.pdf) and "A Model-Base Approach to Reactive, Self-Configuring Systems" (livingstone.pdf). WVU / NASA's partial random search test engine, to be evaluated in this project, is described in "Definition of WVU Test Engines" (wvu_test_engines.pdf). For more information see also "An Alternative to Model Checking: Verification by Random Search of AND-OR Graphs Representing Finite-State Models" (alternative.pdf).

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[1] Because this document was delivered behind schedule, it contains information up-to-date 10/19/02, there is significant overlap with the documents "Definition of Validation Methods for Modeling Languages" and "Definition of Metrics Collection Methods" delivered at the same time.